

## Electron Structure and Periodicity

### Chapter 6: Electron Structure of Atoms Chapter 7: Periodic Properties of the Elements

#### CHAPTER 6-7 OBJECTIVES

- Understand the relationships  $c = \lambda \nu$  and  $E = h\nu$ .
- Understand the concept of a quantized atom and its relationship to a line spectra of atoms.
- Explain the concept of ionization energy.
- Describe the Uncertainty Principle and its affect on atomic theory.
- Understand the relationship  $\lambda = h/mv$  and its affect on atomic theory.
- Describe how quantum numbers define electron orbitals and their value limitations.
- Describe the shapes of the orbital types.
- Understand the concept of electron spin and how it relates to electron configuration.
- Write the electron configuration both symbolically and as an orbital diagram for any element.
- Be able to write electron configurations, especially valence configurations, for any element, using the periodic table with the knowledge of the s,p,d, and f blocks.
- Describe the variations of atomic radii in the groups and periods on the periodic table and the underlying reasons for the variations.
- Describe and explain the observed changes in successive ionization energies for a given atom.
- Describe the variations in first ionization energies in the groups and periods on the periodic table and the underlying reasons for the variations.
- Do the same with the electron affinities of the elements.
- Describe the periodic trends in metallic and nonmetallic behavior and chemical activity.
- Electron Energy Levels and Quantum Mechanics
- Electron Configurations and the Periodic Table
- Periodic Relationships: Atomic Radii, Ionization Energy, Electron Affinity, and Oxidation State

#### Key Words:

- |                                     |                                     |                                |
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| • electromagnetic radiation, p. 218 | • quantum numbers, p. 232           | • ionization energy, p. 271    |
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| • excited state, p. 226             | • atomic radius, p. 267             |                                |

#### Troubleshooting Tips/Error Traps:

- Orbitals are areas of highest probability of finding the electron, *not* the path of the electron.
- Electron shells in an atom are diffuse and overlap considerably.
- Electron affinity is not the opposite of ionization energy.